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Mass Spectrometry of Colonization Factors

This invention is a method for growing enterotoxigenic *Escherichia coli* (ETEC) bacteria and identifying colonization factors (CF) of different strains using mass spectrometry. Infections by ETEC frequently cause diarrhea in travelers and deployed service members in tropical and subtropical climates. The CF, which consist of fimbriae, fibrillae or pili, provide the initial adherence for the ETEC to establish itself. As the CF are important virulence determinants, identification of the CF and associated ETEC strains can lead to faster treatment of individuals with intestinal and extra-intestinal infections.

The method involves obtaining the CF in a sample from a patient, solubilizing it, adding a solution of volatile acid to obtain a product, subjecting the product to mass spectrometry, and comparing the mass to the mass of known CFs. Because the mass of individual amino acids vary, with the exception of leucine and isoleucine, masses of polypeptides are usually unique. Electro-spray mass spectrometry was shown to be extremely accurate (about 1 mass unit/10,000 MW). Multiple strains of *E. coli* belonging to three groups were studied. One group possessed CF in combinations not normally found when screened by monoclonal antibodies, a second group was obtained from children suffering from diarrhea in Egypt, and a third group was obtained from soldiers suffering [illegible]rrhea in Saudi Arabia. The method was found to be relatively simple and highly successful at characterizing the CF in all three groups.

advance of the method over the prior art is that purification of the CF in the sample is not necessary. The method could be combined with others to confirm the identification of ETEC strains.

Features and advantages:

- **Method works on low purity samples**
- **Has identified presence of three different CF in a sample**
- **Uses streamlined growth, purification and sample preparation procedures**

Patent Status

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KEYWORDS: ETEC; colonization factor detection; mass spectrometry; fimbriae; pili; fibrillae; enterotoxigenic *E.coli*

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